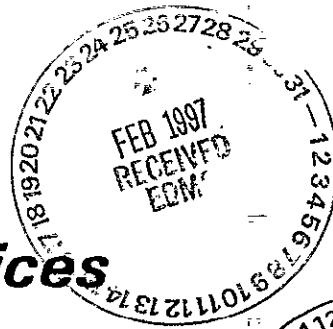


0046802

LOCKHEED MARTIN A

Lockheed Analytical Services

Ms. Joan Kessner
Bechtel Hanford, Inc.
P.O. Box 969
1022 Lee Boulevard
Richland, WA 99352



ANALYTICAL DATA REPORT

FOR

CHLORIDE, NITRATE, NITRITE, SULFATE,
PHOSPHATE, FLUORIDE, METALS, MERCURY,
TOTAL RECOVERABLE PETROLEUM
HYDROCARBONS AND
OIL AND GREASE ORGANICS,
GAMMA SPECTROMETRY, GROSS BETA,
STRONTIUM-90 AND TRITIUM

LOG-IN NUMBER: L8049

QUOTATION NUMBER: Q400000-B

SAF: B96-181

DOCUMENT FILE NUMBER: 0928596

BHI DOCUMENT FILE NO.: 402

SDG NUMBER: LK8049

001



BECHTEL HANFORD
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Sample Login No. L8049

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This report contains 179 pages.

Lockheed Environmental Systems & Technologies Co.
Lockheed Analytical Services
975 Kelly Johnson Drive Las Vegas, Nevada 89119-3705
Telephone 702-361-0220 800-582-7605 Facsimile 702-361-8146

LOCKHEED MARTIN

November 12, 1996

Ms. Joan Kessner
Bechtel Hanford, Inc.
P.O. Box 969
1022 Lee Boulevard
Richland, WA 99352

RE:	Log-in No.:	L8049
	Quotation No.:	Q400000-B
	SAF:	B96-181
	Document File No.:	0928596
	BHI Document File No.:	402
	SDG No.:	LK8049



The attached data report contains the analytical results of samples that were submitted to Lockheed Analytical Services on September 28, 1996. The temperatures of the two coolers upon receipt were 2 and 3°C. Sample containers received agree with the chain-of-custody documentation. All sample containers were received intact. Samples were received in time to meet the analytical holding time requirements.

The case narratives included in the following attachments provide a detailed description of all events that occurred during sample preparation, analysis, and data review specific to the samples and analytical methods requested.

A list of data qualifiers, chain-of-custody forms, sample receiving checklist, and log-in report are also enclosed representing the samples received within this group.

If you have any questions concerning the analysis or the data please call Mary Wolf at (702) 361-3955 ext. 311. If you are unable to contact the client services representative, please call Mary B. Ford, client services manager, at extension 326.

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Sincerely,

Mary K. Wolf

Mary K. Wolf
Client Services Representative

cc: Client Services
Document Control

003

Lockheed Analytical Services

Log-in No.: L8049
Quotation No.: Q400000-B
SAF: B96-181
Document File No.: 0928596
BHI Document File No.: 402
SDG No.: LK8049
Page No.: 1

CASE NARRATIVE INORGANIC NON METALS ANALYSES

The routine calibration and quality control analyses performed for this batch include as applicable: initial and continuing calibration verification, initial and continuing calibration blanks, method blank(s), laboratory control sample(s), matrix spike sample(s), and duplicate sample(s).

Preparation and Analysis Requirements

- Two water samples were sent for LK8049 and analyzed in batch 928 bh for selected analytes to be analyzed in client-specified order as requested on the chain of custody. Quality control analysis was performed on the following samples:

Client ID	LAL #		Method
BOJ1P1	L8049-15	DUP, MS	300.0 Chloride, Nitrate-Nitrogen, Nitrite-Nitrogen, Sulfate, Orthophosphate 340.2 Fluoride

Method Blanks

- The concentration levels of all the requested analytes in the method blank were below the reporting detection limits.

Holding Time Requirements

- All samples were analyzed within the method-specific holding times with the following exceptions:

For Method 300.0 Nitrate-Nitrogen, Nitrite-Nitrogen and Orthophosphate, the samples were received and analyzed outside of method-specific holding time. The associated samples are flagged with an "H".

Internal Quality Control

- All Internal Quality Control were within acceptance limits.

Kay McCann
Prepared By

October 24, 1996
Date

004

Lockheed Analytical Services

Log-in No.: L8049
Quotation No.: Q400000-B
SAF: B96-181
Document File No.: 0928596
BHI Document File No.: 402
SDG No.: LK8049
Page No.: 2

CASE NARRATIVE INORGANIC METALS ANALYSES FILTERED WATER

The routine calibration and quality control analyses performed for this batch include as applicable: instrument tune (ICP/MS only), initial and continuing calibration verification, initial and continuing calibration blanks, method blank(s), laboratory control sample(s), ICP interference check samples (ICP only), serial dilutions, analytical (post-digestion) spike samples, matrix spike (predigestion) sample(s), and duplicate sample(s).

Preparation and Analysis Requirements

All samples were received on September 28, 1996. The samples were logged in as L8049 and were prepared and analyzed in batch 928 bh D for dissolved metals. The samples were analyzed by Method 7000 Furnace Metals for arsenic, selenium, thallium, lead, and antimony, Method 7470 Mercury and Method 6010 ICP Metals for all other analytes.

Holding Time Requirements

- All samples were analyzed within the method-specific holding times.

Method Blanks

- The concentration levels of all the requested analytes in the method blank were below the reporting detection limits.

Internal Quality Control

- All Internal Quality Control were within acceptance limits with the following exception: The matrix spike recovery for selenium was outside of acceptance limits (62%). The recovery based on the LCS (98%) supports that the analytical system was operating within control limits.

Shelbee McGrath
Prepared By

November 6, 1996
Date

Lockheed Analytical Services

Log-in No.: L8049
Quotation No.: Q400000-B
SAF: B96-181
Document File No.: 0928596
BHI Document File No.: 402
SDG No.: LK8049
Page No.: 3

CASE NARRATIVE ORGANIC ANALYSES

Analytical Method 418.1

Analytical Batch 101596PM-418.1

NOTE: Client sample BOJ1PO (L8049-39) was the native sample used for the Matrix Spike (42573MS) and Matrix Spike Duplicate (42573MSD).

The samples were extracted and analyzed within the required holding time on October 15, 1996. All initial and continuing calibrations met criteria. Total Recoverable Petroleum Hydrocarbon (TRPH) was not detected in the Method Blank (42573MB). The recovery of TRPH was within QC limits in the 42573MS, 42573MSD and Laboratory Control Sample (42573LCS). The Relative Percent Difference (RPD) between the 42573MS and 42573MSD recoveries was within QC limits.

Analytical Method 413.1

Analytical Batch 100896-413.1

NOTE: Client sample BOJ1PO (L8049-35) was the native sample used for the 42319MS and 42319MSD.

The samples were extracted and analyzed within the required holding time on October 8, 1996. Oil and Grease was not detected in the 42319MB. The recovery of Oil and Grease was within QC limits in the 42319MS, 42319MSD and 42319LCS. The RPD between the 42319MS and 42319MSD recoveries was within QC limits.

Prepared By
Patricia Lonergan

November 12, 1996

Lockheed Analytical Services

Log-in No.: L8049
Quotation No.: Q400000-B
SAF: B96-181
Document File No.: 0928596
BHI Document File No.: 402
SDG No.: LK8049
Page No.: 4

CASE NARRATIVE RADIOCHEMISTRY ANALYSES

The routine calibration and quality control (QC) analyses performed for this batch include as applicable: instrument calibration, initial and continuing calibration verification, quench monitoring standards, instrument background analysis, method blanks, yield tracer, laboratory control samples, matrix spike samples, and duplicate samples.

Holding Time Requirements

All holding time requirements were met.

Chemical recoveries and minimum detectable activities (MDAs) can be found on the calculation and preparation sheets of the attached analytical raw data.

Gamma Spectrometry

Analytical Method Gamma Spectrometry

The gamma spectrometry analysis was performed using standard operating procedure (SOP), LAL-91-SOP-0063. The samples were analyzed in workgroup 42723. The instrument calibration verification met criteria. The method blank was within QC criteria. The laboratory control sample (LCS) recoveries were within QC criteria. The duplicate (DUP) recoveries were within QC criteria. No re-analyses were performed.

Gas Proportional Counter

Analytical Method Gross Beta

The gross beta analysis was performed using SOP, LAL-91-SOP-0060. The samples were analyzed in workgroup 42721. The instrument calibration verification met criteria. The method blank was within QC criteria. The LCS and matrix spike (MS) recoveries were within QC criteria. The DUP recoveries were within QC criteria. The MDA exceeded the reporting detection limit due to the residue weight limitations forcing a volume reduction. The associated samples were flagged with a "C" qualifier. No re-analyses were performed.

Analytical Method Strontium-90

The strontium-90 analysis was performed using SOP, LAL-91-SOP-0196. The samples were analyzed in workgroup 42720. The instrument calibration verification met criteria. The method blank was within QC criteria. The LCS recovery was within QC criteria. The DUP recoveries were within QC criteria. No re-analyses were performed.

Lockheed Analytical Services

Log-in No.: L8049
Quotation No.: Q400000-B
SAF: B96-181
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SDG No.: LK8049
Page No.: 5

Liquid Scintillation Counter

Analytical Method Tritium

The tritium analysis was performed using SOP, LAL-91-SOP-0066. The samples were analyzed in workgroup 42432. The instrument calibration verification met criteria. The method blank was within QC criteria. The LCS recovery was within QC criteria. The MS activity was 9.99% of the MS sample activity, therefore the MS recovery is not applicable. Since all other QC criteria were met, data quality is not believed to be adversely affected. The DUP recoveries were within QC criteria. The quench value was within curve limitations. No re-analyses were performed.

Yvonne M. Jacoby
Prepared By

November 12, 1996
Date

Lockheed Analytical Services
DATA QUALIFIERS FOR INORGANIC ANALYSES
[Revised 08/28/92]

For Use on the Analytical Data Reporting Forms

B	<i>For CLP Analyses Only</i> -- Reported value is less than the contract required detection limit (CRDL) but greater than or equal to the instrument detection limit (IDL).
C	<i>For Routine, Non-CLP Analyses Only</i> -- Any constituent that was also detected in the associated blank whose concentration was greater than the reporting detection limit (RDL).
D	Presence of high levels of interfering constituents required dilution of sample which increased the RDL by the dilution factor.
E	Estimated value due to presence of interference.
H	Sample analysis performed outside of method-or client-specified maximum holding time requirement.
M	<i>For CLP Analyses Only</i> -- Duplicate injection precision criterion was not met.
N	Matrix spike recovery exceeded acceptance limits.
S	Reported value was determined from the method of standard addition.
U	<i>For CLP Reporting Only</i> -- Constituent was analyzed for but not detected (sample quantitation must be corrected for dilution and percent moisture).
W	<i>For AAS Only</i> -- Post-digestion spike for Furnace AAS did not meet acceptance criteria and sample absorbance is less than 50% of spike absorbance.
X, Y, or Z	Analyst-defined qualifier.
*	Relative percent difference (RPD) for duplicate analysis exceeded acceptance limits.
+	Correlation coefficient (r) for the MSA is less than 0.995.

For Use on the QC Data Reporting Forms

a¹	The spike recovery and/or RPD for matrix spike and matrix spike duplicates cannot be evaluated due to insufficient spiking level compared to the elevated sample analyte concentration.
b¹	The RPD cannot be computed because the sample and/or duplicate concentration was below the RDL.

¹ Used as footnote designations on the QC summary form.

Lockheed Analytical Services
DATA QUALIFIERS FOR ORGANIC ANALYSES

[Revised 02/09/1996]

For Use On The Analytical Data Reporting Forms

A	<i>For CLP analyses Only</i> -- The TIC is a suspected aldol-condensation product.
B	Any constituent that was also detected in the associated blank whose concentration was greater than the practical or reporting detection limit (PQL or RDL).
C	Constituent confirmed by GC/MS analysis. <i>[pesticide/PCB analyses only]</i>
D	Constituent detected in the diluted sample. It also indicates that an accurate quantitation is not possible due to <u>surrogates</u> being diluted out of the samples during the course of the analysis.
E	Constituent concentration exceeded the calibration range.
G	The quantitation is not gasoline or diesel but believed to be some other combination of hydrocarbons.
H	Sample analysis performed outside of method- or client-specified maximum holding time requirement.
J	<i>Estimated value</i> -- (1) constituent detected at a level less than the RDL or PQL and greater than or equal to the MDL; (2) estimated concentration for TICs (<i>For CLP Reporting Only</i>).
N	<i>For CLP Reporting Only</i> -- Tentatively identified constituents (TICs) identified based on mass spectral library search.
NQ	Analyte detected, but Not Quantified; see result from subsequent analysis
P	<i>For CLP Reporting Only</i> -- The percent difference between the concentrations detected on both GC columns was greater than 25 percent <i>[pesticide/PCB analyses only]</i> .
U	<i>For CLP Reporting Only</i> -- Constituent was analyzed for but not detected (sample quantitation must be corrected for dilution and percent moisture).
X, Y, or Z	Analyst-defined qualifier.
N/A (% Moisture)	N/A in the % moisture cell indicates that data are reported on an "as received" basis. A value in the % moisture cell indicates that data are reported based on a "dry weight" basis.

For Use On The QC Data Reporting Forms

*	QC data (i.e., percent recovery data for matrix spike, matrix spike duplicate, laboratory control standard, or surrogates; and RPD for matrix spike duplicate or unspiked duplicate) exceeded acceptance limits.
a ¹	The spike recovery and/or RPD for matrix spike and matrix spike duplicates cannot be evaluated due to insufficient spiking level compared to the elevated sample analyte concentration.
b ¹	The RPD cannot be computed because the sample and/or duplicate concentration was below the RDL.

¹ Used as footnote designations on the QC Summary Form.

Lockheed Analytical Services
DATA QUALIFIERS FOR RADIOCHEMICAL ANALYSES
[Revised 04/05/96]

For Use on the Analytical Data Reporting Forms	
B	Any constituent that was detected in the associated method blank at a concentration was greater than the reporting detection limit (RDL).
C	The minimum detectable activity exceeded the RDL due to the residue weight limitations forcing a volume reduction.
D	Constituent detected in the diluted sample.
E	Constituent concentration exceeded the calibration or attenuation curve range.
F	<i>For Alpha Spectrometry Only--</i> Full width half max exceeded the acceptance limits.
H	Sample analysis performed outside of method-specified maximum holding time requirement.
Y	Chemical yield exceeded acceptance limits.
For Use on the QC Data Reporting Forms	
*	QC data (i.e., percent recovery data for laboratory control standard and matrix spike; and RPD for replicate analyses) exceeded acceptance limits.
a ¹	The spike recovery and/or RPD for matrix spike and duplicates cannot be evaluated due to insufficient spiking level compared to the elevated sample analyte concentration.
b ¹	The RPD cannot be computed because the sample and/or duplicate concentration was below the MDA.

¹ Used as foot note designations on the QC summary form.

LOCKHEED MARTIN

SAMPLE LOGIN AND CHAIN OF CUSTODY

Revised

LOCKHEED ANALYTICAL SERVICES
 LOGIN CHAIN OF CUSTODY REPORT (ln01)
 Oct 04 1996, 07:02 am

Login Number: L8049
 Account: 596 Bechtel Hanford, Inc. * Richland, WA
 Project: BECHTEL-HANFORD Bechtel Hanford Project

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	Due PR Date
L8049-1 TEMP 2,3 Location: L8060-1 Water 1 S NONE	B0JDW7	26-SEP-96	28-SEP-96	12-NOV-96
		Hold:06-OCT-96		
L8049-2 TEMP 2,3 Location: 156-018 Water 1 S SCREENING	B0J1P0	26-SEP-96	28-SEP-96	12-NOV-96
		Hold:25-MAR-97		
L8049-3 TEMP 2,3 Location: 156-018 Water 1 S SCREENING	B0J1P1	26-SEP-96	28-SEP-96	12-NOV-96
		Hold:25-MAR-97		
L8049-4 TEMP 2,3 Location: L8060-2 Water 1 S NONE	B0JDW7	26-SEP-96	28-SEP-96	12-NOV-96
		Hold:06-OCT-96		
L8049-5 TEMP 2,3 Location: L8060-3	B0JDW7	26-SEP-96	28-SEP-96	12-NOV-96
L8049-6 TEMP 2,3 Location: L8060-4	B0JDW7	26-SEP-96	28-SEP-96	12-NOV-96
L8049-7 TEMP 2,3 Location: L8060-5	B0JDW7	26-SEP-96	28-SEP-96	12-NOV-96
L8049-8 TEMP 2,3 Location: L8060-6	B0JDW7	26-SEP-96	28-SEP-96	12-NOV-96
L8049-9 TEMP 2,3 Location: L8060-7 Water 1 S NONE	B0JDW9	26-SEP-96	28-SEP-96	12-NOV-96
		Hold:06-OCT-96		
L8049-10 TEMP 2,3 Location: L8060-8	B0JDW9	26-SEP-96	28-SEP-96	12-NOV-96

Page 1

*Login revised because of 2 SAFs logged
together. 104-96 New*

013

0928596

LOCKHEED ANALYTICAL SERVICES
 LOGIN CHAIN OF CUSTODY REPORT (ln01)
 → Oct 04 1996, 07:02 am

Login Number: L8049
 Account: 596 Bechtel Hanford, Inc. * Richland, WA
 Project: BECHTEL-HANFORD Bechtel Hanford Project

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	Due PR Date
L8049-11 TEMP 2,3 Location: L8060-9	BOJDW9	26-SEP-96	28-SEP-96	12-NOV-96
L8049-12 TEMP 2,3 Location: L8060-10	BOJDW9	26-SEP-96	28-SEP-96	12-NOV-96
L8049-13 TEMP 2,3 Location: L8060-11	BOJDW9	26-SEP-96	28-SEP-96	12-NOV-96
L8049-14 TEMP 2,3 Location: 156CART-5 Water 1 S TRITIUM(H3) LAL-0066 Hold:25-MAR-97	BOJ1P1	26-SEP-96	28-SEP-96	12-NOV-96
L8049-15 TEMP 2,3 Location: 121 Water 1 S 300.0 CHLORIDE Water 1 S 300.0 NITRATE Water 1 S 300.0 NITRITE Water 1 S 300.0 PHOSPHATE Water 1 S 300.0 SULFATE Water 1 S 340.2 FLUORIDE	BOJ1P1	26-SEP-96	28-SEP-96	12-NOV-96
Hold:24-OCT-96 Hold:28-SEP-96 Hold:28-SEP-96 Hold:28-SEP-96 Hold:24-OCT-96 Hold:24-OCT-96				
L8049-16 TEMP 2,3 Location: 121 Water 1 S 300.0 CHLORIDE Water 1 S 300.0 NITRATE Water 1 S 300.0 NITRITE Water 1 S 300.0 PHOSPHATE Water 1 S 300.0 SULFATE Water 1 S 340.2 FLUORIDE	BOJ1P0	26-SEP-96	28-SEP-96	12-NOV-96
Hold:24-OCT-96 Hold:28-SEP-96 Hold:28-SEP-96 Hold:28-SEP-96 Hold:24-OCT-96 Hold:24-OCT-96				
L8049-17 TEMP 2,3 Location: RFG02-28B Filt H2O 15 S 6010 ICP METALS Filt H2O 15 S 7000 FURNACE METALS Filt H2O 15 S 7470 MERCURY	BOJ1P0	26-SEP-96	28-SEP-96	12-NOV-96
Hold:25-MAR-97 Hold:25-MAR-97 Hold:24-OCT-96				

LOCKHEED ANALYTICAL SERVICES
 LOGIN CHAIN OF CUSTODY REPORT (ln01)
 Oct 04 1996, 07:02 am

Login Number: L8049
 Account: 596 Bechtel Hanford, Inc. * Richland, WA
 Project: BECHTEL-HANFORD Bechtel Hanford Project

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	Due PR Date
L8049-18 TEMP 2,3 Location: RFG02-28B Filt H2O 15 S 6010 ICP METALS Filt H2O 15 S 7000 FURNACE METALS Filt H2O 15 S 7470 MERCURY	BOJ1P1	26-SEP-96	28-SEP-96	12-NOV-96
		Hold:25-MAR-97		
		Hold:25-MAR-97		
		Hold:24-OCT-96		
L8049-19 TEMP 2,3 "ICP+Tn, Pb" Location: L8060-12 Water 1 S NONE	BOJDW7	26-SEP-96	28-SEP-96	12-NOV-96
		Hold:06-OCT-96		
L8049-20 TEMP 2,3 "ICP+Tn, Pb" Location: L8060-13 Water 1 S NONE	BOJDW8	26-SEP-96	28-SEP-96	12-NOV-96
		Hold:06-OCT-96		
L8049-21 TEMP 2,3 Location: 156CART-5 Water 1 S GROSS BETA LAL-0060	BOJ1P0	26-SEP-96	28-SEP-96	12-NOV-96
		Hold:25-MAR-97		
L8049-22 TEMP 2,3 Location: 156CART-5 Water 1 S GROSS BETA LAL-0060	BOJ1P1	26-SEP-96	28-SEP-96	12-NOV-96
		Hold:25-MAR-97		
L8049-23 TEMP 2,3 Location: 156CART-5 Water 1 S GAMMA SPEC LAL-0063	BOJ1P1	26-SEP-96	28-SEP-96	12-NOV-96
		Hold:25-MAR-97		
L8049-24 TEMP 2,3 Location: 156CART-5	BOJ1P1	26-SEP-96	28-SEP-96	12-NOV-96
L8049-25 TEMP 2,3 Location: 156CART-5	BOJ1P1	26-SEP-96	28-SEP-96	12-NOV-96
L8049-26 TEMP 2,3 Location: 156CART-5	BOJ1P1	26-SEP-96	28-SEP-96	12-NOV-96

LOCKHEED ANALYTICAL SERVICES
 LOGIN CHAIN OF CUSTODY REPORT (ln01)
 Oct 04 1996, 07:02 am

Login Number: L8049
 Account: 596 Bechtel Hanford, Inc. * Richland, WA
 Project: BECHTEL-HANFORD Bechtel Hanford Project

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	Due PR Date
L8049-27 TEMP 2,3 Location: 156CART-5 Water 1 S SR-90 LAL-0196	BOJ1P1	26-SEP-96	28-SEP-96	12-NOV-96
		Hold:25-MAR-97		
L8049-28 TEMP 2,3 Location: 156CART-5	BOJ1P1	26-SEP-96	28-SEP-96	12-NOV-96
L8049-29 TEMP 2,3 Location: 156CART-5	BOJ1P1	26-SEP-96	28-SEP-96	12-NOV-96
L8049-30 TEMP 2,3 Location: 156CART-5	BOJ1P1	26-SEP-96	28-SEP-96	12-NOV-96
L8049-31 TEMP 2,3 Location: 156CART-5 Water 1 S SR-90 LAL-0196	BOJ1P0	26-SEP-96	28-SEP-96	12-NOV-96
		Hold:25-MAR-97		
L8049-32 TEMP 2,3 Location: 156CART-5	BOJ1P0	26-SEP-96	28-SEP-96	12-NOV-96
L8049-33 TEMP 2,3 Location: 156CART-5	BOJ1P0	26-SEP-96	28-SEP-96	12-NOV-96
L8049-34 TEMP 2,3 Location: 156CART-5	BOJ1P0	26-SEP-96	28-SEP-96	12-NOV-96
L8049-35 TEMP 2,3 Location: 157 Water 1 S 413.1 OIL AND GREASE	BOJ1P0	26-SEP-96	28-SEP-96	12-NOV-96
		Hold:24-OCT-96		
L8049-36 TEMP 2,3 Location: 157	BOJ1P0	26-SEP-96	28-SEP-96	12-NOV-96

LOCKHEED ANALYTICAL SERVICES
 LOGIN CHAIN OF CUSTODY REPORT (ln01)
 Oct 04 1996, 07:02 am

Login Number: L8049
 Account: 596 Bechtel Hanford, Inc. * Richland, WA
 Project: BECHTEL-HANFORD Bechtel Hanford Project

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	Due Date	PR Date
L8049-37 TEMP 2,3 Location: 157	BOJ1P0	26-SEP-96	28-SEP-96	12-NOV-96	
L8049-38 TEMP 2,3 Location: 157	BOJ1P0	26-SEP-96	28-SEP-96	12-NOV-96	
L8049-39 TEMP 2,3 Location: 157 Water 1 S 418.1 TPH	BOJ1P0	26-SEP-96	28-SEP-96	12-NOV-96	
		Hold:24-OCT-96			
L8049-40 TEMP 2,3 Location: 157	BOJ1P0	26-SEP-96	28-SEP-96	12-NOV-96	
L8049-41 TEMP 2,3 Location: 157	BOJ1P0	26-SEP-96	28-SEP-96	12-NOV-96	
L8049-42 TEMP 2,3 Location: 157	BOJ1P0	26-SEP-96	28-SEP-96	12-NOV-96	
L8049-43 Location: Water 1 S EDD - DISK DEL. Water 1 S GC2 Water 1 S GCMS2 Water 1 S INORG TYPE 4A RPT Water 1 S RAD RPT TYPE 2 Water 1 S WOLF	REPORT TYPE	28-SEP-96	28-SEP-96	12-NOV-96	

L 8049

Bechtel Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST								B96-181-39	Page 1 of 1
Collector <i>A. Rizzo</i>	Company Contact J. V. Borgese	Telephone No. (509) 373-4790				Project Coordinator Koerner, CC			Date Turnaround 45 Days		
Project Designation 100-NR-2 Groundwater Sampling -- Round 10	Sampling Location 100 N				SAF No. B96-181						
Ice Chest No. <i>ER-210</i>	Field Logbook No. <i>EFZ-1224</i>				Method of Shipment Federal Express						
Shipped To Lockheed	Offsite Property No. <i>W96-0-0314-10</i>				Bill of Lading/Air Bill No. <i>277 1632 966</i>						
POSSIBLE SAMPLE HAZARDS/REMARKS NA		Preservation	None	None	Cool 4C	HNO3 to pH <2	HNO3 to pH <2	HNO3 to pH <2	HNO3 to pH <2		
		Type of Container	P	G	P	P	P	P	P		
		No. of Container(s)	1	1	1	1	1	4	4		
Special Handling and/or Storage Maintain samples between 2 degrees C and 6 degrees C.		Volume	20ml	500ml	500ml	500ml	1000ml	1000ml	1000ml		
SAMPLE ANALYSIS											
Sample No.	Matrix *	Sample Date	Sample Time	Activity Scan	Titanium + H3	See Item (I) in Special Instructions.	ICP Metals - 6010A (TAL)	Gross Beta	Gamma Spectroscopy(Water)	Strontium-89,90	
BOJ1P1	Water	9-26-96	13:30	X	X	X	X	X	X	X	
CHAIN OF POSSESSION		Sign/Print Names				SPECIAL INSTRUCTIONS					Matrix *
Relinquished By <i>A.G. Rizzo (ER-210)</i>	Date/Time 9/26/96	Received By <i>K. Trapp / K. Trapp</i>	Date/Time 9/26/96	** Sample analysis for nitrate, nitrite, and phosphate by EPA 300.0 is being requested for information only. The ERC Contractor acknowledges the 48-hour holding time will not be met. The sample for ICP Metals is filtered.					(I) IC Anions - 300.0 (Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate)		S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air DS = Drum Solids DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other
Relinquished By <i>K. Trapp / K. Trapp</i>	Date/Time 9/27/96	Received By	Date/Time								
Relinquished By <i>O</i>	Date/Time	Received By	Date/Time								
Relinquished By <i>OO</i>	Date/Time	Received By	Date/Time								
LABORATORY SECTION	Received By <i>P. L. C.</i>	Title <i>Sample Custody</i>				Date/Time 9-28-96 / 17:30					
FINAL SAMPLE	Disposal Method					Disposed By					

Bechtel Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST							B96-181-38	Page 1 of 1	
Collector A-L-R-22c		Company Contact J. V. Borghese		Telephone No. (509) 373-4790			Project Coordinator Koerner, CC		Data Turnaround 45 Days		
Project Designation 100-NR-2 Groundwater Sampling - Round 10		Sampling Location 100 N						SAF No. B96-181			
Ice Chest No. ER-26		Field Logbook No. EFL-12px						Method of Shipment Federal Express			
Shipped To Lockheed		Offsite Property No. W96-U-0314-10						Bill of Lading/Air Bill No. 277 1632 857			
POSSIBLE SAMPLE HAZARDS/REMARKS NA		Preservation	None	Cool 4C	HNO ₃ to pH <2	HNO ₃ to pH <2	H ₂ SO ₄ to pH <2 Cool 4C	HCl to pH <2 Cool 4C	HNO ₃ to pH <2		
		Type of Container	P	P	P	P	G	G	P		
		No. of Container(s)	1	1	1	1	4	4	4		
Special Handling and/or Storage Maintain samples between 2 degrees C and 6 degrees C.		Volume	20ml	500ml	500ml	1000ml	1000ml	1000ml	1000ml		
SAMPLE ANALYSIS				Activity Scan	See Item (1) in Special Instructions.	ICP Metals - 6010A (TAL)	Gross Beta	Oil & Grease - 413.1	TPH (Total) - 418.1	Sodium - 89.90	
Sample No.	Matrix *	Sample Date	Sample Time								
80J1PO	Water	9/26/96	1002	X	X	X	X	X	X		
CHAIN OF POSSESSION		Sign/Print Names				SPECIAL INSTRUCTIONS				Matrix *	
Relinquished By A-L-R-22c (ER)	Date/Time 1630C 9/26/96	Received By K. Trapp / K. Trapp	Date/Time 1630C 9/26/96	** Sample analysis for nitrate, nitrite, and phosphate by EPA 300.0 is being requested for information only. The ERC Contractor acknowledges the 48-hour holding time will not be met. The sample for ICP Metals is filtered.				S - Soil SE - Sediment SO - Solid SL - Sludge W - Water O - Oil A - Air DS - Drum Solids DL - Drum Liquids T - Tissue WI - Wipe L - Liquid V - Vegetation X - Other			
Relinquished By K. Trapp / K. Trapp	Date/Time 1050 9/27/96	Received By	Date/Time	(1) IC Anions - 300.0 (Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate)							
Relinquished By O	Date/Time	Received By	Date/Time								
Relinquished By G	Date/Time	Received By	Date/Time								
LABORATORY SECTION	Received By P. C. (C. J.) Dan	Title Sample Collection				Date/Time 9/28/96 / 9:40					
FINAL SAMPLE	Disposal Method					Disposed By				Date/Time	

028288

Environmental Restoration Contractor

**Environmental
Restoration
Contractor** *ERC Team*

Job No. 22192
Written Response Requests NO
CCN: N/A
OU: N/A
TDR: N/A
EDR: N/A
Section Codes: SED

TO: W. S. Thompson N1-28 **DATE:** February 29, 1996
G. C. Henckel H4-80

COPIES: K. A. Smith X0-23 **FROM:** S. K. De Mers *[Signature]*
T. L. Lafreniere X0-23 Radiological Controls
D. E. Gergely X0-23 T7-05/373-1913

SUBJECT: Total Activities for Off-Site Shipments of Groundwater Samples to NRC Licensed Laboratories

There is no need to perform total activities prior to offsite shipment to NRC licensed labs of samples taken from ground water wells located on the Hanford Site.

All wells reviewed to date for radiological content have shown no well with a total activity in excess of 2,000,000 pCi/l (2,000 pCi/gm), the Department Of Transportation limit for radioactive material. The highest activity in any known well is 1.56×10^4 pCi/l H³.

While this does not constitute any release from radiological controls for worker protection, it does allow samples to be shipped based on historical laboratory data and save the expense of doing radiochemical analysis.

A copy of the most recent analytical data should be provided to the NRC licensed laboratory with the samples being shipped or if no data is available for new wells, the most recent data from adjacent wells.

020

0928594

Lockheed Analytical Laboratory
SAMPLE SUMMARY REPORT (su02)
--Bechtel Hanford, Inc. * Richland, WA

CLIENT Sample Number	LAL Sample Number	BDG Number	Matrix	Method
BOJ1P0	L8049-2 L8049-16 L8049-16 L8049-16 L8049-16 L8049-16 L8049-16 L8049-17 L8049-17 L8049-17 L8049-21 L8049-31 L8049-35 L8049-39	Water Water Water Water Water Water Water Filt H2O Filt H2O Filt H2O Water Water Water Water		SCREENING 300.0 CHLORIDE 300.0 NITRATE 300.0 NITRITE 300.0 PHOSPHATE 300.0 SULFATE 340.2 FLUORIDE 6010 ICP METALS 7000 FURNACE MET 7470 MERCURY GROSS BETA LAL-(SR-90 LAL-0196 413.1 OIL AND GI 418.1 TPH
BOJ1P1	L8049-3 L8049-14 L8049-15 L8049-15 L8049-15 L8049-15 L8049-15 L8049-18 L8049-18 L8049-18 L8049-22 L8049-23 L8049-27	Water Water Water Water Water Water Water Filt H2O Filt H2O Filt H2O Water Water Water		SCREENING TRITIUM(H3) LAL- 300.0 CMLORIDE 300.0 NITRATE 300.0 NITRITE 300.0 PHOSPHATE 300.0 SULFATE 340.2 FLUORIDE 6010 ICP METALS 7000 FURNACE MET 7470 MERCURY GROSS BETA LAL-(GAMMA SPEC LAL-(SR-90 LAL-0196
BOJDW7	L8049-1 L8049-4 L8049-19	Water Water Water		NONE NONE NONE
BOJDW8	L8049-20	Water		NONE
BOJDW9	L8049-9	Water		NONE
REPORT TYPE	L8049-43 L8049-43 L8049-43 L8049-43 L8049-43 L8049-43	Water Water Water Water Water Water		EDD - DISK DEL. GC2 GCMS2 INORG TYPE 4A RI RAD RPT TYPE 2 WOLF

Lockheed Analytical Laboratory
 SAMPLE SUMMARY REPORT (su02)
 Bechtel Hanford, Inc. * Richland, WA

Client Sample Number	LAL Sample Number	SDG Number	Matrix	Method
BOJ1P0 -	L8049-2 L8049-16 L8049-16 L8049-16 L8049-16 L8049-16 L8049-16 L8049-17 L8049-17 L8049-17 L8049-21 L8049-31 L8049-35 L8049-39	Water Water Water Water Water Water Water Filt H2O Filt H2O Filt H2O Water Water Water Water		SCREENING - 300.0 CHLORIDE - 300.0 NITRATE - 300.0 NITRITE - 300.0 PHOSPHATE - 300.0 SULFATE - 340.2 FLUORIDE - 6010 ICP METALS - 7000 FURNACE ME - 7470 MERCURY - GROSS BETA LAL - SR-90 LAL-0196 413.2 OIL AND GI 418.1 TPH -
BOJ1P1 -	L8049-3 L8049-14 L8049-15 L8049-15 L8049-15 L8049-15 L8049-15 L8049-15 L8049-18 L8049-18 L8049-18 L8049-22 L8049-23 L8049-27	Water Water Water Water Water Water Water Water Filt H2O Filt H2O Filt H2O Water Water Water		SCREENING - TRITIUM(H3) LAL - 300.0 CHLORIDE - 300.0 NITRATE - 300.0 NITRITE - 300.0 PHOSPHATE - 300.0 SULFATE - 340.2 FLUORIDE - 6010 ICP METALS - 7000 FURNACE ME - 7470 MERCURY - GROSS BETA LAL - GAMMA SPEC LAL - SR-90 LAL-0196
BOJDW7 -	L8049-1 L8049-4 L8049-19 L8049-19 L8049-19	Water Water Water Water Water		SCREENING - 8240 VOLATILES 6010 ICP METALS 7000 FURNACE ME 7470 MERCURY -
BOJDW8 -	L8049-20 L8049-20 L8049-20	Water Water Water		6010 ICP METALS 7000 FURNACE ME 7470 MERCURY -
BOJDW9	L8049-9	Water		8240 VOLATILES -
REPORT TYPE -	L8049-43 L8049-43 L8049-43 L8049-43 L8049-43 L8049-43	Water Water Water Water Water Water		EDD - DISK DEL. GC2 - GCMS2 - INORG TYPE 4A R RAD RPT TYPE 2 WOLF

LOCKHEED MARTIN

NON-METALS

WATER

023

LOCKHEED ANALYTICAL SERVICES

Sample Results

Client Sample ID: B0J1P1	Date Collected: 26-SEP-96
Matrix: Water	Date Received: 28-SEP-96
Percent Solids: N/A	

Constituent	Units	Method	Result	Project Reporting Limit	Data Qualifier(s)	Date Analyzed	LAS Batch ID	LAS Sample ID
Chloride	mg/L	300.0	2.3	0.020		03-OCT-96	42004	L8049-15
Nitrate-N	mg/L	300.0	2.2	0.020	H	03-OCT-96	41995	L8049-15
Nitrite-N	mg/L	300.0	< 0.002	0.010	HU	03-OCT-96	42005	L8049-15
Ortho Phosphate	mg/L	300.0	0.023	0.10	HB	10-OCT-96	42006	L8049-15
Sulfate	mg/L	300.0	45.	0.10		03-OCT-96	42007	L8049-15
Fluoride	mg/L	340.2	0.38	0.050		21-OCT-96	42008	L8049-15

LOCKHEED ANALYTICAL SERVICES

Sample Results

Client Sample ID: B0J1P0	Date Collected: 26-SEP-96
Matrix: Water	Date Received: 28-SEP-96
Percent Solids: N/A	

Constituent	Units	Method	Result	Project Reporting Limit	Data Qualifier(s)	Date Analyzed	LAS Batch ID	LAS Sample ID
Chloride	mg/L	300.0	22.	0.020		03-OCT-96	42004	L8049-16
Nitrate-N	mg/L	300.0	5.6	0.020	H	03-OCT-96	41995	L8049-16
Nitrite-N	mg/L	300.0	< 0.002	0.010	HU	03-OCT-96	42005	L8049-16
Ortho Phosphate	mg/L	300.0	0.070	0.10	HB	10-OCT-96	42006	L8049-16
Sulfate	mg/L	300.0	240	0.10		03-OCT-96	42007	L8049-16
Fluoride	mg/L	340.2	0.091	0.050		21-OCT-96	42008	L8049-16

LOCKHEED ANALYTICAL LABORATORY
QUALITY CONTROL DATA SUMMARY
DUPLICATE SAMPLE ANALYSES

LAL BATCH: 928-BH

DUPLICATE SAMPLES

LAS ID	ANALYTE	SAMPLE	DUPLICATE	RPD (%)	FLAG
		RESULT	SAMPLE		
L8049-15	CHLORIDE	2.32 mg/L	2.28 mg/L	2 %	
L8049-15	NITRITE-N	<0.002 mg/L	<0.002 mg/L		b Km 10-18-96
L8049-15	NITRATE-N	2.16 mg/L	2.16 mg/L	0 %	
L8049-15	SULFATE	44.53 mg/L	44.44 mg/L	0 %	

LOCKHEED ANALYTICAL LABORATORY
QUALITY CONTROL DATA SUMMARY
DUPLICATE SAMPLE ANALYSES

LAL BATCH: 928-BH

DUPLICATE SAMPLES

LAS ID	ANALYTE	SAMPLE	DUPLICATE	RPD (%)	FLAG
		RESULT	SAMPLE		
L8049-15	ORTHO-PHOSPHAT	0.0230 mg/L (B)	-0.0172 mg/L (B) ≤ 0.0200 mg/L	10/21/96	b

LOCKHEED MARTIN

METALS

FILTERED WATER

047

LOCKHEED ANALYTICAL SERVICES

Sample Results

Client Sample ID: B0J1P0	Date Collected: 26-SEP-96
Matrix: Filt H2O	Date Received: 28-SEP-96
Percent Solids: N/A	

Constituent	Units	Method	Result	MDL	RDL	Data Qual	Dilution	Date Analyzed	LAS Batch ID	LAS Sample ID
ALUMINUM, DISSOLVED	mg/l	6010	< 0.048	0.048	0.20	U	1	23-OCT-96	42437	L8049-17
BARIUM, DISSOLVED	mg/l	6010	0.070	0.0080	0.20	B	1	23-OCT-96	42437	L8049-17
BERYLLIUM, DISSOLVED	mg/l	6010	< 0.0010	0.0010	0.0050	U	1	23-OCT-96	42437	L8049-17
CADMIUM, DISSOLVED	mg/l	6010	< 0.0030	0.0030	0.0050	U	1	23-OCT-96	42437	L8049-17
CALCIUM, DISSOLVED	mg/l	6010	140	0.010	5.0		1	23-OCT-96	42437	L8049-17
CHROMIUM, DISSOLVED	mg/l	6010	< 0.0060	0.0060	0.010	U	1	23-OCT-96	42437	L8049-17
COBALT, DISSOLVED	mg/l	6010	0.0097	0.0040	0.050	B	1	23-OCT-96	42437	L8049-17
COPPER, DISSOLVED	mg/l	6010	< 0.0060	0.0060	0.025	U	1	23-OCT-96	42437	L8049-17
IRON, DISSOLVED	mg/l	6010	0.0070	0.0060	0.10	B	1	23-OCT-96	42437	L8049-17
MAGNESIUM, DISSOLVED	mg/l	6010	23.	0.062	5.0		1	23-OCT-96	42437	L8049-17
MANGANESE, DISSOLVED	mg/l	6010	0.0020	0.0010	0.015	B	1	23-OCT-96	42437	L8049-17
NICKEL, DISSOLVED	mg/l	6010	< 0.012	0.012	0.040	U	1	23-OCT-96	42437	L8049-17
POTASSIUM, DISSOLVED	mg/l	6010	5.9	1.4	5.0		1	23-OCT-96	42437	L8049-17
SILVER, DISSOLVED	mg/l	6010	< 0.0060	0.0060	0.010	U	1	23-OCT-96	42437	L8049-17
SODIUM, DISSOLVED	mg/l	6010	50.	0.32	5.0		1	23-OCT-96	42437	L8049-17
VANADIUM, DISSOLVED	mg/l	6010	< 0.0060	0.0060	0.050	U	1	23-OCT-96	42437	L8049-17
ZINC, DISSOLVED	mg/l	6010	< 0.0030	0.0030	0.020	U	1	23-OCT-96	42437	L8049-17
ANTIMONY, DISSOLVED	mg/l	7041	< 0.0090	0.0090	0.060	U	1	05-NOV-96	42438	L8049-17
ARSENIC, DISSOLVED	mg/l	7060	< 0.0030	0.0030	0.010	U	1	28-OCT-96	42438	L8049-17
LEAD, DISSOLVED	mg/l	7421	< 0.0020	0.0020	0.0030	U	1	28-OCT-96	42438	L8049-17
SELENIUM, DISSOLVED	mg/l	7740	< 0.0030	0.0030	0.0050	NUN	1	28-OCT-96	42438	L8049-17
THALLIUM, DISSOLVED	mg/l	7840	< 0.0030	0.0030	0.010	UN	1	28-OCT-96	42438	L8049-17
MERCURY, DISSOLVED	mg/l	7470	< 0.00020	0.00020	0.00020	U	1	22-OCT-96	42439	L8049-17

LOCKHEED ANALYTICAL SERVICES

Sample Results

Client Sample ID: BOJ1P1	Date Collected: 26-SEP-96
Matrix: Filt H2O	Date Received: 28-SEP-96
Percent Solids: N/A	

Constituent	Units	Method	Result	MDL	RDL	Data Qual	Dilution	Date Analyzed	LAS Batch ID	LAS Sample ID
ALUMINUM, DISSOLVED	mg/l	6010	< 0.048	0.048	0.20	U	1	23-OCT-96	42437	L8049-18
BARIUM, DISSOLVED	mg/l	6010	0.023	0.0080	0.20	B	1	23-OCT-96	42437	L8049-18
BERYLLIUM, DISSOLVED	mg/l	6010	< 0.0010	0.0010	0.0050	U	1	23-OCT-96	42437	L8049-18
CADMIUM, DISSOLVED	mg/l	6010	< 0.0030	0.0030	0.0050	U	1	23-OCT-96	42437	L8049-18
CALCIUM, DISSOLVED	mg/l	6010	30.	0.010	5.0		1	23-OCT-96	42437	L8049-18
CHROMIUM, DISSOLVED	mg/l	6010	0.19	0.0060	0.010		1	23-OCT-96	42437	L8049-18
COBALT, DISSOLVED	mg/l	6010	0.0041	0.0040	0.050	B	1	23-OCT-96	42437	L8049-18
COPPER, DISSOLVED	mg/l	6010	< 0.0060	0.0060	0.025	U	1	23-OCT-96	42437	L8049-18
IRON, DISSOLVED	mg/l	6010	< 0.0060	0.0060	0.10	U	1	23-OCT-96	42437	L8049-18
MAGNESIUM, DISSOLVED	mg/l	6010	15.	0.062	5.0		1	23-OCT-96	42437	L8049-18
MANGANESE, DISSOLVED	mg/l	6010	0.0032	0.0010	0.015	B	1	23-OCT-96	42437	L8049-18
NICKEL, DISSOLVED	mg/l	6010	< 0.012	0.012	0.040	U	1	23-OCT-96	42437	L8049-18
POTASSIUM, DISSOLVED	mg/l	6010	4.6	1.4	5.0	B	1	23-OCT-96	42437	L8049-18
SILVER, DISSOLVED	mg/l	6010	< 0.0060	0.0060	0.010	U	1	23-OCT-96	42437	L8049-18
SODIUM, DISSOLVED	mg/l	6010	23.	0.32	5.0		1	23-OCT-96	42437	L8049-18
VANADIUM, DISSOLVED	mg/l	6010	0.017	0.0060	0.050	B	1	23-OCT-96	42437	L8049-18
ZINC, DISSOLVED	mg/l	6010	< 0.0030	0.0030	0.020	U	1	23-OCT-96	42437	L8049-18
ANTIMONY, DISSOLVED	mg/l	7041	< 0.0090	0.0090	0.060	UNW	1	05-NOV-96	42438	L8049-18
ARSENIC, DISSOLVED	mg/l	7060	0.0064	0.0030	0.010	B	1	28-OCT-96	42438	L8049-18
LEAD, DISSOLVED	mg/l	7421	< 0.0020	0.0020	0.0030	U	1	28-OCT-96	42438	L8049-18
SELENIUM, DISSOLVED	mg/l	7740	< 0.0030	0.0030	0.0050	UNW	1	28-OCT-96	42438	L8049-18
THALLIUM, DISSOLVED	mg/l	7840	< 0.0030	0.0030	0.010	U	1	28-OCT-96	42438	L8049-18
MERCURY, DISSOLVED	mg/l	7470	< 0.00020	0.00020	0.00020	U	1	22-OCT-96	42439	L8049-18

LOCKHEED ANALYTICAL SERVICES

METALS RESULTS

QC Data Summary For Duplicate Sample Analysis

Client Sample ID BOJ1P0 (DUP)

Constituent	Units	LAS Batch ID	LAS Sample ID	Date Analyzed	Sample Result	Duplicate Result	Relative Percent Difference	Control Limit	Data Qualifier
ALUMINUM, DISSOLVED	mg/l	42437	L8049-17	23-OCT-96	< 0.048	< 0.048	b		
BARIUM, DISSOLVED	mg/l	42437	L8049-17	23-OCT-96	0.07024	0.07439		0.20	
BERYLLIUM, DISSOLVED	mg/l	42437	L8049-17	23-OCT-96	< 0.0010	< 0.0010	b		
CADMIUM, DISSOLVED	mg/l	42437	L8049-17	23-OCT-96	< 0.0030	< 0.0030	b		
CALCIUM, DISSOLVED	mg/l	42437	L8049-17	23-OCT-96	137.4	144.6	5		
CHROMIUM, DISSOLVED	mg/l	42437	L8049-17	23-OCT-96	< 0.0060	0.006280	b		
COBALT, DISSOLVED	mg/l	42437	L8049-17	23-OCT-96	0.009730	0.007600		0.050	
COPPER, DISSOLVED	mg/l	42437	L8049-17	23-OCT-96	< 0.0060	< 0.0060	b		
IRON, DISSOLVED	mg/l	42437	L8049-17	23-OCT-96	0.006980	0.009290		0.10	
MAGNESIUM, DISSOLVED	mg/l	42437	L8049-17	23-OCT-96	22.82	24.13		5.0	
MANGANESE, DISSOLVED	mg/l	42437	L8049-17	23-OCT-96	0.002030	< 0.0010	b		
NICKEL, DISSOLVED	mg/l	42437	L8049-17	23-OCT-96	< 0.012	< 0.012	b		
POTASSIUM, DISSOLVED	mg/l	42437	L8049-17	23-OCT-96	5.909	5.954		5.0	
SILVER, DISSOLVED	mg/l	42437	L8049-17	23-OCT-96	< 0.0060	< 0.0060	b		
SODIUM, DISSOLVED	mg/l	42437	L8049-17	23-OCT-96	49.79	52.18	5		
VANADIUM, DISSOLVED	mg/l	42437	L8049-17	23-OCT-96	< 0.0060	< 0.0060	b		
ZINC, DISSOLVED	mg/l	42437	L8049-17	23-OCT-96	< 0.0030	< 0.0030	b		
ANTIMONY, DISSOLVED	mg/l	42438	L8049-17	05-NOV-96	< 0.0090	< 0.0090	b		
ARSENIC, DISSOLVED	mg/l	42438	L8049-17	28-OCT-96	< 0.0030	< 0.0030	b		
LEAD, DISSOLVED	mg/l	42438	L8049-17	28-OCT-96	< 0.0020	< 0.0020	b		
SELENIUM, DISSOLVED	mg/l	42438	L8049-17	28-OCT-96	< 0.0030	< 0.0030	b		
THALLIUM, DISSOLVED	mg/l	42438	L8049-17	28-OCT-96	< 0.0030	< 0.0030	b		
MERCURY, DISSOLVED	mg/l	42439	L8049-17	22-OCT-96	< 0.00020	0.0002026	b		

LOCKHEED ANALYTICAL SERVICES

TOTAL PETROLEUM HYDROCARBONS BY FTIR
418.1 TPH

Client Sample ID:	B0J1PO	LAL Sample ID:	L8049-39
Date Collected:	26-SEP-96	Date Received:	28-SEP-96
Date Analyzed:	15-OCT-96	Analytical Batch ID:	101596PM-418.1
Date Extracted:	15-OCT-96	Analytical Dilution:	_1
Matrix:	Water	Preparation Dilution:	1.0
		QC Group:	418.1 TPH_42573

CONSTITUENT	CAS NO.	RESULT mg/L	MDL mg/L	PQL/REL mg/L	DATA QUALIFIER(S)
TPH		<1.0	0.20	1.0	

LOCKHEED ANALYTICAL SERVICES

SPIKED SAMPLE RESULT TOTAL PETROLEUM HYDROCARBONS BY FTIR

Client Sample ID: BOJ1P0
Date Collected: 26-SEP-96
Date Analyzed: 15-OCT-96
Date Extracted: 15-OCT-96

LAL Sample ID: 42573MS
Date Received: 28-SEP-96
Analytical Batch ID: 101596PM-418.1
Analytical Dilution: 1
Preparation Dilution: 1.0
QC Group: 418.1 TPH_42573

CONSTITUENT	CAS NO.	RESULT mg/L	MDL mg/L	PQL/RDL mg/L	DATA QUALIFIER(S)
TRPH		2.3	0.20	1.0	

LOCKHEED ANALYTICAL SERVICES

SPIKED SAMPLE RESULT TOTAL PETROLEUM HYDROCARBONS BY FTIR

Client Sample ID:	BOJ1P0	LAL Sample ID:	42573MSD
Date Collected:	26-SEP-96	Date Received:	28-SEP-96
Date Analyzed:	15-OCT-96	Analytical Batch ID:	101596PM-418.1
Date Extracted:	15-OCT-96	Analytical Dilution:	1
		Preparation Dilution:	1.0
		QC Group:	418.1 TPH_42573

CONSTITUENT	CAS NO.	RESULT mg/L	MDL mg/L	PQL/RDL mg/L	DATA QUALIFIER(%)
TRPH		2.3	0.20	1.0	

LOCKHEED ANALYTICAL SERVICES

OIL AND GREASE - GRAVIMETRIC METHOD 413.1 OIL AND GREASE

Client Sample ID:	BOJ1P0	LAL Sample ID:	L8049-35
Date Collected:	26-SEP-96	Date Received:	28-SEP-96
Date Analyzed:	08-OCT-96	Analytical Batch ID:	100896AM-413.1
Date Extracted:	08-OCT-96	Analytical Dilution:	1
Matrix:	Water	Preparation Dilution:	1.0
		QC Group:	413.1 OIL AND GREASE_42319

CONSTITUENT	CAS NO.	RESULT	MDL	POL/RDL	DATA QUALIFIER(S)
Oil and Grease	10-30-0	<5.0	2.0	5.0	

RADIOCHEMISTRY

LOCKHEED ANALYTICAL SERVICES

RADIOCHEMISTRY DATA REPORT

Account Name: Bechtel Hanford, Inc. * Richland, WA
Project Name: BECHTEL-HANFORD
Project Desc: Bechtel Hanford Project

Client Sample ID: BOJ1P1
Date Collected: 26-SEP-96
Matrix: Water

Login Number: L8049
Date Received: 28-SEP-96

Constituent	Method	Net	Activity	Error	ND	Count Factor	Units	Analyst	Entered By
H-3	LAL-0066	42432	42600	2500	230		pCi/L	08-NOV-96	L8049-14

LOCKHEED ANALYTICAL SERVICES

RADIOCHEMISTRY DATA REPORT

Account Name: Bechtel Hanford, Inc. * Richland, WA
Project Name: BECHTEL-HANFORD
Project Desc: Bechtel Hanford Project

Client Sample ID: BOJ1PO
Date Collected: 26-SEP-96
Matrix: Water

Login Number: L8049
Date Received: 28-SEP-96

Constituent	Sample	Date	Activity	From	To	Qualified	Units	Analyzed	Entered	Entered By
Gross Beta	LAL-0060	42721	834.	45.	4.9	C	pCi/L	22-OCT-96	L8049-21	

LOCKHEED ANALYTICAL SERVICES

RADIOCHEMISTRY DATA REPORT

Account Name: Bechtel Hanford, Inc. * Richland, WA
Project Name: BECHTEL-HANFORD
Project Desc: Bechtel Hanford Project

Client Sample ID: BOJ1P1
Date Collected: 26-SEP-96
Matrix: Water

Login Number: L8049
Date Received: 28-SEP-96

COLLECTOR	INSTRUMENT	BATCH	ACTIVITY	EFFICIENCY	PER	WATER SOURCE	MANUFACTURER	TEST NUMBER
Gross Beta	LAL-0060	42721	6.0	1.7	2.3		pCi/L	22-OCT-96 L8049-22

LOCKHEED ANALYTICAL SERVICES

RADIOCHEMISTRY DATA REPORT

Account Name: Bechtel Hanford, Inc. * Richland, WA
Project Name: BECHTEL-HANFORD
Project Desc: Bechtel Hanford Project

Client Sample ID: BOJ1P1
Date Collected: 26-SEP-96
Matrix: Water

Login Number: L8049
Date Received: 28-SEP-96

Constituent	Sample	Batch	Activity	Error	SD	Qualifies	Units	Analytical	Sample ID
Ac-228(Ra-228)	LAL-0063	42723	-16.	17.	44.		pCi/L	24-OCT-96	L8049-23
Co-58	LAL-0063	42723	-3.5	6.1	11.		pCi/L	24-OCT-96	L8049-23
Co-60	LAL-0063	42723	-1.6	1.5	7.4		pCi/L	24-OCT-96	L8049-23
Cs-137	LAL-0063	42723	0.3	7.3	9.3		pCi/L	24-OCT-96	L8049-23
Eu-152	LAL-0063	42723	-10.1	7.9	45.		pCi/L	24-OCT-96	L8049-23
Eu-154	LAL-0063	42723	-23.	10.	50.		pCi/L	24-OCT-96	L8049-23
Eu-155	LAL-0063	42723	-3.9	5.8	18.		pCi/L	24-OCT-96	L8049-23
Fe-59	LAL-0063	42723	-5.6	6.1	26.		pCi/L	24-OCT-96	L8049-23
Pb-212	LAL-0063	42723	-8.	11.	16.		pCi/L	24-OCT-96	L8049-23
Pb-214(Ra-226)	LAL-0063	42723	-6.	13.	21.		pCi/L	24-OCT-96	L8049-23
Ra-226(GAMMA)	LAL-0063	42723	0.00	130	170		pCi/L	24-OCT-96	L8049-23
Ru-106	LAL-0063	42723	7.	62.	81.		pCi/L	24-OCT-96	L8049-23
U-235(GAMMA)	LAL-0063	42723	2.	31.	45.		pCi/L	24-OCT-96	L8049-23

LOCKHEED ANALYTICAL SERVICES

RADIOCHEMISTRY DATA REPORT

Account Name: Bechtel Hanford, Inc. * Richland, WA
Project Name: BECHTEL-HANFORD
Project Desc: Bechtel Hanford Project

Client Sample ID: BOJ1P1
Date Collected: 26-SEP-96
Matrix: Water

Login Number: L8049
Date Received: 28-SEP-96

CONSTITUENT	MEASURED	BATCH	ACTIVITY REPORT	PPM	QUALITY CONTROL	ANALYST	DATE	LAB ID
Sr-89,90	LAL-0196	42720	0.49	0.44	0.73	ppm/L	25-OCT-96	L8049-27

LOCKHEED ANALYTICAL SERVICES

RADIOCHEMISTRY DATA REPORT

Account Name: Bechtel Hanford, Inc. * Richland, WA
Project Name: BECHTEL-HANFORD
Project Desc: Bechtel Hanford Project

Client Sample ID: BOJ1PO
Date Collected: 26-SEP-96
Matrix: Water

Login Number: L8049
Date Received: 28-SEP-96

Constituent	Method	Source	Activity	Result	Units	Qualifier	Limit	Date Rec'd	Lab ID
Sr-89,90	LAL-0196	42720	420.	21.	0.77	pCi/L		25-OCT-96	L8049-31

LOCKHEED ANALYTICAL SERVICES

DUPLICATE DATA SUMMARY

Login/SDG Number: L8049

Sample ID	Run ID	Date	Analyst	Location	Specimen ID	Sample Type	Conc.	Conc.	Conc.	Conc.	Units	RER	RPD	DATA SOURCES	RPD SOURCES
Sr-89/90	42720	25-OCT-96	JS	CS	LB1-B1	BOJ0K5	L7919-2	670.	34.0	683.	34.6	pCi/L	0.185	2	25
Gross Beta	42721	22-OCT-96	JW	LV	LB1-C1	BOJ1P0	L8049-21	834.	45.4	890.	48.2	pCi/L	0.598	6	30
Co-60	42723	24-OCT-96	WF	LV	GAM-1	BOJ1P1	L8049-23	-1.56	1.52	1.25	8.29	pCi/L	0.290	1810	20
Cs-137	42723	24-OCT-96	WF	LV	GAM-1	BOJ1P1	L8049-23	0.270	7.35	1.76	7.94	pCi/L	0.100	147	20
Pb-214(Ra-226)	42723	24-OCT-96	WF	LV	GAM-1	BOJ1P1	L8049-23	-5.77	13.0	-10.7	9.05	pCi/L	0.220	60	20

NOTE: Data qualified as out of limits if RPD > 20% and RER > 1.

427231.XLS

Client	Bechtel_Hanford								
Client ID	BOJ1P1								
Filename	427231.CHN								
LAL parent ID	42723DUP1								
Batch	6342723								
Live Time	10800								
Detector	1	LAS Detector 1, GMX-30200-P, Ser. No. 30-TN10223A							
Geometry	N								
Aliquot (gms/L)	0.5								
Count date	10/24/96 18:00								
Collection Date	9/26/96								
delta T to midpoint of count	28.8	days							
Efficiency data file	N194								
Background, Library files	WBKG1292	whc							
							V96119		
Nuclide	keV	halflife (days)	chnl	GROSS	BKG	NET	Hand Calc NET	Sample cnts/sec	1 sig % err
Ra-226	186.1	5.84E+05	372	200	90	110	0.0101852	15.5	
U-235	185.7	2.57E+11	372	200	90	110	0.0101852	15.5	
	143.8	2.57E+11	288	152	106	46	0.0042593	34.9	
	163.3	2.57E+11	327	135	122	13	0.0012037	123.3	
Pb-214(Ra-226)	351.9	5.84E+05	704	80	58	22	0.002037	53.4	
	295.1	5.84E+05	591	88	92	-4	-0.000386	322.1	
Fe-59	1099.2	4.51E+01	2198	13	23	-10	-0.000957	58.3	
	1291.6	4.51E+01	2583	10	13	-3	-0.000262	168.7	
Co-58	810.8	7.08E+01	1622	25	26	-1	-6.17E-05	1067.7	
Ac-228(Ra-228)	911.2	2.10E+03	1822	39	30	9	0.0007986	96.6	
	969	2.10E+03	1938	31	24	7	0.0006481	105.9	
Pb-212	238.6	5.11E+12	478	143	102	41	0.0037963	38.2	
	300.1	5.11E+12	600	66	74	-8	-0.000741	147.9	
Co-60	1332.5	1924	2665	15	15	0	0	0.0	
	1173.3	1924	2347	28	17	12	0.0010648	58.0	
Cs-137	661.7	10950	1324	43	35	8	0.0007716	105.8	
Eu-156	105.3	1810	211	117	119	-2	-0.000201	709.3	
Eu-152	1408.1	4.64E+03	2816	8	9	-1	-0.000123	312.2	
	344.3	4.64E+03	689	75	53	23	0.0020833	50.2	
Eu-154	723.3	3.11E+03	1447	33	30	3	0.0002469	298.4	
	1004.8	3.11E+03	2009	22	15	7	0.0006327	89.2	
	1274.5	3.11E+03	2549	13	20	-7	-0.000633	83.9	
Ru-106	621.8	368.2	1244	42	35	7	0.0006481	125.4	
	1050.1	368.2	2100	16	15	1	7.716E-05	669.9	

Client	Bechtel_Hanford								
Client ID	BOJ1P1								
Filename	427231.CHN								
LAL parent ID	42723DUP1								
Batch	6342723								
Live Time	10800								
Detector	1								
Geometry	N								
Aliquot (gms/L)	0.5								
Count date	10/24/96 18:00								
Collection Date	9/26/96								
delta T to midpoint of count	28.8								
Efficiency data file	N194								
Background, Library files	WBKG1292								
Nuclide	keV	WBKG cnts/sec	NET		NET		1 sigma		Branch
			1 sig	% err	Sample cnts/sec	1 sig	% err	Efficiency	
Ra-226	186.1	0.011331	5.9	-0.00134	167.06	0.055308	5	0.035	
U-235	185.7	0.011331	5.9	-0.00115	195.84	0.055389	5	0.575	
	143.8	0.002983	20.7	0.00128	164.89	0.063815	5	0.109	
	163.3	0.001717	33.0	-0.00051	399.70	0.059981	5	0.05	
Pb-214(Ra-226)	351.9	0.00245	18.2	-0.00041	371.46	0.03237	5	0.358	
	295.1	0.001761	27.9	-0.00215	35.04	0.037986	5	0.185	
Fe-59	1099.2	3.89E-05	574.5	-0.00100	33.62	0.011918	5	0.565	
	1291.6	-0.00023	75.8	-0.00026	168.65	0.010338	5	0.432	
Co-58	810.8	-0.00029	92.3	-0.00006	1067.71	0.015465	5	0.9945	
Ac-228(Ra-228)	911.2	0.000802	40.0	0.00000	31442.53	0.014001	5	0.266	
	969	0.000533	53.0	0.00011	844.43	0.013285	5	0.1617	
Pb-212	238.6	0.006225	9.2	-0.00243	83.37	0.045721	5	0.4365	
	300.1	0.000567	77.7	-0.00131	50.12	0.037416	5	0.03344	
Co-60	1332.5	-0.00021	100.7	0.00000	0.00	0.010051	5	0.999	
	1173.3	0.00055	43.0	0.00051	165.88	0.011258	5	0.999	
Cs-137	661.7	0.000261	128.0	0.00051	225.33	0.018405	5	0.8521	
Eu-155	105.3	0.000592	96.0	-0.00079	107.94	0.06833	5	0.218	
Eu-152	1408.1	0.000025	773.2	-0.00015	129.47	0.009557	5	0.212	
	344.3	0.000269	163.6	0.00181	81.95	0.033022	5	0.27	
Eu-154	723.3	0.000594	50.2	-0.00035	297.86	0.017049	5	0.197	
	1004.8	-0.00044	53.9	0.00063	89.22	0.012878	5	0.176	
	1274.5	4.17E-05	440.9	-0.00067	51.43	0.010462	5	0.355	
Ru-106	621.8	0.000397	82.9	0.00025	455.00	0.019424	5	0.0981	
	1050.1	-0.00024	98.1	0.00008	669.93	0.012399	5	0.0146	

Client	Bechtel_Hanford							
Client ID	BOJ1P1							
Filename	427231.CHN							
LAL parent ID	42723DUP1							
Batch	6342723							
Live Time	10800							
Detector	1							
Geometry	N							
Aliquot (gms/L)	0.5							
Count date	10/24/96 18:00							
Collection Date	9/26/96							
delta T to midpoint of count	28.8							
Efficiency data file	N194							
Background, Library files	WBKG1292							
Nuclide	keV	Bq	pCi/L	MDA pCi/L	Decay factor	Corrected pCi/L	error 1 sigma	Corrected MDA pCi/L
Ra-226	186.1	-0.693605	-37.45467	182.03	1.000034	-37.46	62.60	182.04
U-235	185.7	-0.035963	-1.942006	11.06	1	-1.942	3.80	11.06
	143.8	0.183431	9.905275	41.24	1	9.905	16.34	41.24
	163.3	-0.171042	-9.236243	96.42	1	-9.236	36.92	96.42
Pb-214(Ra-226)	351.9	-0.035636	-1.924356	19.61	1.000034	-1.924	7.15	19.61
	295.1	-0.305508	-16.49744	36.81	1.000034	-16.498	5.84	36.82
Fe-59	1099.2	-0.147865	-7.984729	18.84	1.557105	-12.433	4.23	29.34
	1291.6	-0.058743	-3.172123	19.78	1.557105	-4.939	8.33	30.80
Co-58	810.8	-0.004014	-0.216733	8.06	1.325996	-0.287	3.07	10.69
Ac-228(Ra-228)	911.2	-0.000932	-0.050345	42.64	1.009556	-0.051	15.98	43.05
	969	0.053448	2.886218	65.35	1.009556	2.914	24.61	65.98
Pb-212	238.6	-0.121696	-6.571598	15.83	1	-6.572	5.49	15.83
	300.1	-1.044944	-56.42698	177.16	1	-56.427	28.42	177.16
Co-60	1332.5	0	0	9.62	1.010434	0.0000	0.00	9.72
	1173.3	0.045774	2.47177	11.00	1.010434	2.4976	4.14	11.11
Cs-137	661.7	0.032551	1.757728	9.94	1.001826	1.7609	3.97	9.96
Eu-155	105.3	-0.053188	-2.872131	18.40	1.011095	-2.904	3.138	18.603
Eu-152	1408.1	-0.073274	-3.95677	42.25	1.004314	-3.97	5.15	42.43
	344.3	0.203442	10.98588	20.93	1.004314	11.03	9.06	21.02
Eu-154	723.3	-0.103472	-5.587507	46.00	1.006453	-5.62	16.75	46.30
	1004.8	0.279155	15.07435	39.01	1.006453	15.17	13.56	39.26
	1274.5	-0.181574	-9.804995	31.84	1.006453	-9.87	5.10	32.05
Ru-106	621.8	1.32E-01	7.11E+00	8.36E+01	1.055739	7.5074	34.16	88.25
	1050.1	4.26E-01	2.30E+01	5.30E+02	1.055739	24.3006	162.80	559.52

Client	Bechtel_Hanford				
Client ID	BOJ1P1				
Filename	427231.CHN				
LAL parent ID	42723DUP1				
Batch	6342723				
Live Time	10800				
Detector	1				
Geometry	N				
Aliquot (gms/L)	0.5				
Count date	10/24/96 18:00				
Collection Date	9/26/96				
delta T to midpoint of count	28.8				
Efficiency data file	N194				
Background, Library files	WBKG1292				
Nuclide	keV	Counting Error pCi/L	FINAL RESULT pCi/L	Total Error 2 sigma	MDA pCi/L
Ra-226	186.1	125.15	-37.46	125.21	182.04
U-235	185.7 143.8 163.3	7.61 20.64	-1.94 6.77	7.61 29.89	11.06 41.24 96.42
Pb-214(Ra-226)	351.9 295.1	7.44	-10.67	9.05	19.61 36.82
Fe-59	1099.2 1291.6	7.19	-10.90	7.54	29.34 30.80
Co-58	810.8	6.14	-0.29	6.14	10.69
Ac-228(Ra-228)	911.2 969	13.99	0.83	26.80	43.05 65.98
Pb-212	238.6 300.1	5.65 -56.43	-6.57 56.84	10.98 56.84	15.83 177.16
Co-60	1332.5 1173.3	4.14	1.25	8.29	9.72 11.11
Cs-137	661.7	7.94	1.76	7.94	9.96
Eu-155	105.3	6.27	-2.90	6.28	18.60
Eu-152	1408.1 344.3	0.43	-0.31	8.95	42.43 21.02
Eu-154	723.3 1004.8 1274.5	5.89	-6.68	9.18	46.30 39.26 32.05
Ru-106	621.8 1050.1	61.85	8.216	66.865	88.25 559.52

$\text{Ra-226} \rightarrow \frac{-37.46 - 10.67}{125.21 + 9.05} = 0.22$
 $\text{Pb-214} \rightarrow \frac{-1.94 - 10.67}{125.21 + 9.05} = 0.29$
 $\text{Co-60} \rightarrow \frac{-6.57 - 1.76}{10.98 + 56.84} = 0.10$
 $\text{Cs-137} \rightarrow \frac{1.25 - 1.76}{10.98 + 56.84} = 0.10$

JLR 10/26/96